

What is claimed is:

1. An optical receiver comprising:

- (a) a substrate;
- (b) a photodiode (PD) placed on the substrate;
- 5 (c) a light-transmitting medium that:
  - (c1) is placed on the substrate; and
  - (c2) receives light, having multiplexed wavelengths, from outside; and
- (d) a wavelength-selecting filter that:
  - (d1) is placed at the end face of the light-transmitting medium;
  - (d2) selects light having a specified wavelength out of light emerging from the light-transmitting medium; and
  - (d3) transmits the selected light to the PD to enable the PD to detect it.

2. An optical receiver comprising:

- (a) a substrate;
- 15 (b) a PD placed on the substrate;
- (c) a light-transmitting medium that:
  - (c1) is placed on the substrate; and
  - (c2) receives light, having multiplexed wavelengths, from outside; and
- (d) a wavelength-selecting filter that:
  - (d1) is placed at the midpoint of the light-transmitting medium;
  - (d2) selects light having a specified wavelength out of light emerging from the light-transmitting medium; and
  - (d3) transmits the selected light to the PD to enable the PD to detect it.

3. An optical receiver as defined in claim 1, wherein the light-transmitting medium is an optical fiber.

4. An optical receiver as defined in claim 1, wherein the light-transmitting medium is an optical waveguide formed on the substrate.

5 5. An optical receiver as defined in claim 2, wherein the light-transmitting medium is an optical fiber.

6. An optical receiver as defined in claim 2, wherein the light-transmitting medium is an optical waveguide formed on the substrate.

7. An optical receiver as defined in claim 1 or 2, wherein the wavelength-selecting filter is placed obliquely to the axis of the light-transmitting medium.

10 8. An optical receiver as defined in claim 1 or 2, wherein the substrate is a ceramic substrate.

9. An optical receiver as defined in claim 1 or 2, wherein the substrate is an Si substrate.

15 10. An optical receiver as defined in claim 4 or 6, wherein the optical waveguide is an SiO<sub>2</sub>-based optical waveguide.

11. An optical receiver as defined in claim 1 or 2, wherein the PD, the wavelength-selecting filter, and part of the light-transmitting medium are covered with a transparent resin.

20 12. An optical receiver as defined in claim 1 or 2, wherein the PD is a back-illuminated PD.

13. An optical receiver as defined in claim 1 or 2, wherein an amplifier is provided on the substrate to amplify the photocurrent generated by the PD.

14. An optical receiver as defined in claim 3, wherein:

- (a) a groove is formed on the substrate to fix the optical fiber; and
- (b) an optical pathway-changing groove is formed on the substrate to reflect light having passed through the wavelength-selecting filter into the PD.

5 15. An optical receiver as defined in claim 4, wherein an optical pathway-changing groove is formed on the substrate to reflect light having passed through the wavelength-selecting filter so that the light can be introduced into the PD.

16. An optical receiver as defined in claim 5, wherein:

- (a) a groove is formed on the substrate to fix the optical fiber therein;
- (b) an oblique space is provided at a midpoint of the optical fiber;
- (c) the wavelength-selecting filter is inserted into the oblique space; and
- (d) an optical pathway-changing groove is formed on the substrate to reflect light having emerged from the end of the optical fiber into the PD.

15 17. An optical receiver as defined in claim 6, wherein:

- (a) an oblique space is provided at a midpoint of the optical waveguide;
- (b) the wavelength-selecting filter is inserted into the oblique space; and
- (c) an optical pathway-changing groove is formed on the substrate to reflect light having emerged from the end of the optical waveguide into the PD.

20 18. An optical receiver as defined in claim 6, wherein:

- (a) a space is provided at the midpoint of the optical waveguide;
- (b) the wavelength-selecting filter is supported obliquely in the space;
- (c) a collimator is placed in the space and in front of the wavelength-

selecting filter;

(d) an inverse collimator is placed in the space and behind the wavelength-selecting filter; and

(e) an optical pathway-changing groove is formed on the substrate to reflect light having emerged from the end of the optical waveguide into the PD.

5 19. An optical receiver as defined in claim 5, wherein:

(a) a ferrule is provided and houses the optical fiber therein as a unitary structure;

(b) a filter-supporting hole is provided at a midpoint of the ferrule;

10 (c) the wavelength-selecting filter is inserted into the filter-supporting hole;

(d) a groove is formed on the substrate to fix the ferrule; and

(e) an optical pathway-changing groove is formed on the substrate to reflect light having emerged from the end of the optical fiber into the PD.

20 20. An optical receiver as defined in claim 5, wherein:

15 (a) the wavelength-selecting filter is a collimator-integrated wavelength-selecting filter, in which a wavelength-selecting filter, a collimator placed in front of the filter, and an inverse collimator placed behind the filter are integrated into a single unit;

(b) a ferrule is provided and houses the optical fiber therein as a unitary structure;

20 (c) a filter-supporting hole is provided at the midpoint of the ferrule;

(d) the collimator-integrated wavelength-selecting filter is inserted into the filter-supporting hole;

- (e) a groove is formed on the substrate to fix the ferrule; and
- (f) an optical pathway-changing groove is formed on the substrate to reflect light having emerged from the end of the optical fiber into the PD.

21. An optical receiver as defined in claim 19 or 20, wherein:

- 5 (a) the wavelength-selecting filter is placed perpendicular to the axis of the optical fiber;
- (b) gaps are provided between the wavelength-selecting filter and the filter-supporting hole; and
- (c) a transparent resin fills the gaps.

10 22. An optical receiver as defined in claim 19 or 20, wherein:

- (a) the wavelength-selecting filter is placed obliquely to the axis of the optical fiber;
- (b) gaps are provided between the wavelength-selecting filter and the filter-supporting hole; and
- 15 (c) a transparent resin fills the gaps.

23. An optical receiver as defined in claim 5, wherein:

- (a) the wavelength-selecting filter is a collimator-integrated wavelength-selecting filter, in which a wavelength-selecting filter, a collimator placed in front of the filter, and an inverse collimator placed behind the filter are integrated into a single unit;
- (b) a ferrule is provided and houses the optical fiber therein as a unitary structure;
- (c) the ferrule is severed at the midpoint;

(d) the collimator-integrated wavelength-selecting filter is inserted into the severed portion;

(e) a groove is formed on the substrate to house the ferrule together with the collimator-integrated wavelength-selecting filter;

5 (f) the groove aligns the center of the collimator-integrated wavelength-selecting filter with that of the optical fiber;

(g) the ferrule and the collimator-integrated wavelength-selecting filter are fixed in the groove; and

(h) an optical pathway-changing groove is formed on the substrate to reflect light having emerged from the end of the optical fiber into the PD.

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